

METHODS FOR PRODUCING LOW-K CDO FILMS WITH LOW RESIDUAL STRESS

ABSTRACT

Methods of preparing a carbon doped oxide (CDO) layer of low dielectric constant and low residual stress are provided. The methods involve, for instance, providing a substrate to a deposition chamber and exposing it to an organosilicon precursor containing unsaturated CC bonds or to multiple organic precursors in which at least one would be organosilicon and at least one would possess unsaturated CC bond, followed by igniting and maintaining a plasma in a deposition chamber using radio frequency power having high and low frequency components with a high percentage of the low frequency component, and depositing the carbon doped dielectric layer under conditions in which the resulting dielectric layer has a residual stress of not greater than, e.g., about 50MPa, and a dielectric constant not greater than about 3.